

Patent: Procedure for obtaining metal nanoparticles and their use in Raman spectroscopy

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Description

The present invention relates to a **procedure for obtaining metal nanoparticles** from salt solutions using their metal cations, such as silver, gold, copper, aluminium and palladium salts, for their use in the **manufacture of sensors for the detection of organic compounds of the calibre of pesticides, by means of Raman spectroscopy.**



Need or problem solved

- The procedure described in this invention allows **metal nanoparticles to be obtained** that can be laid on substrates and, particularly, silver, gold, copper, aluminium or palladium nanoparticles with morphologies that make them especially **useful for the manufacture of sensors applicable to the detection of organic compounds (in crops, water, food) by means of the "Surface-Enhanced Raman Spectrometry"**.
- The method of reference for the detection of organic contaminants is **chromatography coupled with high resolution mass spectrometry**. This method **has drawbacks, solved in this patent**, such as the **high cost of the instruments required and the labour-intensive preparation of the samples**.
- When the compound to be detected is adsorbed on an adequate nanostructured substrate, **trace amounts of the compound can be detected by "Surface-Enhanced Raman Spectrometry"**.

Innovative issues/Competitive advantages

The detection procedure using this invention's sensors has numerous advantages, when compared with the existing procedure; the following are to be noted:

- Lower cost of the required analytical equipment
- Absence of equipment maintenance costs
- Simple and easy implementation that does not require qualified technical staff
- Fast analyses because the preparation of the samples does not require any complex processes
- Sensors with high chemical stability
- Sensors can be re-used; high sensitivity; selectivity
- Not limited to the detection of a single type of contaminant

Types of interested companies

- **Companies in the Agricultural-Food sector, such as those dealing with olive and citrus trees:** For instance, the invention would allow these companies to perform internal emissions monitoring, thus facilitating their compliance with the regulations in force, since phytosanitary doses could be quickly and precisely adjusted, depending on emission levels measured.
- Businesses related to the **Health and Environment sector**, because of its usefulness in the analysis of water (contamination of rivers, lakes, aquifers, etc.) and food.